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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,146	11/26/2001	Min-Su Kim	SAM-0274	8596

7590

06/11/2003

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 06/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/994,146

Applicant(s)

KIM ET AL.

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 18-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 18-27 are objected to because of the following informalities: Claim 18 recites the limitation that "the source and drain regions have a symmetrical structure." However, the original disclosure lacks an adequate description regarding in what sense the source structure and the drain structure are symmetrical to each other. As shown in Fig. 2A of the instant application, the two structures are not exactly symmetrical because the source structure (130) comprises a half of the P-N junction structure formed with the body contact region (16).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 18-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 18 and 28 each recite the subject matters that the insular body region is disposed between the source and drain regions and that the body contact region is in contact with the insular body region. However, according to the original disclosure (see Figs. 2A and 2B), the insular body also has an extended portion which is not exactly between the source and drain region but rather outside the

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source, drain and channel regions. It is such an extended portion that has a direct contact with the heavily doped body contact region.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 28-36, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(b) as being anticipated by Tyson (US 5,317,181).

Tyson discloses a semiconductor device (see Figs. 1-3) having an SOI structure, comprising: an insulating layer (34; oxide); an insular silicon region (P-; inherently a single crystal layer) including an insular body region (18, P-), a channel (32); a gate oxide layer (34); a gate conductive layer (12); a heavily doped body contact region (22 and/or 24), a source region (14; n+); a drain region (16; n+); a conductive layer (26; TiSi, a salicide), wherein the body contact region being in contact with and connected to the source region and the insular body region, and the heavily doped body contact region does not overlap with the gate.

It is noted that the semiconductor device in Tyson is a MOSFET device, which inherently includes a source electrode and a gate electrode in order to be functionable. And, such a source electrode is inherently connected to the body contact region since

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the body contact region has already been shortened to the source region by the conductive layer (26).

Regarding claim 36, the MOSFET Tyson can also be formed as a P-channel MOSFET (see col. 6, lines 48-49), which would be naturally have a P-type source region and an N-type channel region.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18-27, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyson (US 5,317,181) in view of Bahraman (US 5,001,528).

The disclosure of Tyson is discussed as applied to claims 28-36.

Although Tyson does not expressly disclose that the geometry of the source structure can be symmetrical to that of the drain structure in the sense that they have a same width and a same length, one of ordinary skill in the art would readily recognize that such a symmetry can be readily and desirably formed for achieving maximum effective channel width with structure simplicity, as evidenced in Bahraman (see the substantially symmetrical source region (2a) and drain region (2b) in Figs. 1-3).

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Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporate the symmetric source/drain structure of Bahraman into the semiconductor device of Tyson, so that a MOSFET device with maximum effective channel width and structure simplicity would be obtained.

Regarding claim 24 and 25, one of ordinary skill in the art would be readily recognize that the gate conductive layer and the source conductive layer can both be readily and desirably formed as a salicide layer comprising a same metal silicide layer during a same salicide process for reducing the interconnection resistance, as evidenced in the prior art such as Blake et al. (4,899,202; see the salicide gate conductive layer (10 and 22) and the salicide source conductive layer (6 and 22) in Fig. 4.

### ***Response to Arguments***

Applicant's arguments with respect to claims 18-36 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH  
June 4, 2003

  
Shouxiang Hu  
Patent Examiner  
TC2800